

Passenger Seat Vibration Control of Quarter Car System with MR Shock Absorber

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Abstract : Semi-active Fuzzy control of quarter car system having three degrees of freedom and assembled with magneto-rheological (MR) shock absorber is studied in present paper. First, experimental work was performed on an MR shock absorber under different excitation conditions to obtain force-displacement and force-velocity curves. Then, for the application of experimental data in semi-active quarter car system, a polynomial model was selected. Finally, Fuzzy logic controller was designed having the combination of Forward fuzzy controller and Inverse fuzzy controller for integration in secondary suspension system of concerned model. The proposed controlled quarter car model was compared with uncontrolled system using simulation work under bump type of road excitation. Results obtained by simulation work shows the effectiveness of fuzzy controlled suspension system in improving the ride comfort and safety of travelling passengers compared to uncontrolled suspension system.

Keywords : MR shock absorber, three degrees of freedom, quarter car model, fuzzy controller

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